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June 18, 1991.

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7-11-91

IN THE U.S. PATENT & TRADEMARK OFFICE

In re Application of:

XUAN TRUONG NGUYEN

For: RECYCLING WASTE CELLULOSIC MATERIAL

S.N.: 663,397

Filed: March 1, 1991

Preliminary Class 162

The Commissioner of Patents
& Trademarks,
Washington, D.C. 20231,
U.S.A.

PRELIMINARY AMENDMENT

Sir:

Please amend the application as follows.

SPECIFICATION:

At page 6, line 2, delete "to leave" and insert
therefor ...leaves....;

At page 8, line 25, delete "62" and insert
therefor ...69...;

At page 8, line 31, delete "62" and insert
therefor ...66...

CLAIMS:

Please enter in the application new claims 22
to 47 hereinafter.

22. A process for recycling waste cellulosic paper
product to produce a cellulosic fiber pulp comprising:

digesting waste manufactured paper product in
an aqueous cooking liquor at an elevated temperature to
effect a delignification of cellulosic fibers in said
waste product and produce a brownstock of a cellulosic

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fiber pulp and spent liquor, said cellulosic fiber pulp having a kappa number lower than that of said paper product.

23. A process of claim 22 wherein said waste manufactured paper product has a kappa number of at least

80.

24. A process according to claim 22 wherein said delignification is carried out under an atmosphere of saturated steam.

25. A process according to claim 23 wherein said delignification is carried out under an atmosphere of saturated steam.

26. A process according to claim 22 wherein said delignification is carried out under non-oxidizing conditions.

27. A process according to claim 23 wherein said delignification is carried out under non-oxidizing conditions.

28. A process of claim 22 wherein said waste paper product comprises a single waste paper product having a kappa number of at least 80.

29. A process of claim 22 wherein said waste paper product comprises a mixture of waste paper products, at least one of which has a kappa number of at least 80.

30. A process of claim 22 wherein said waste paper product is waste paperboard.

31. A process of claim 30 wherein said waste paperboard has a kappa number of 80 to 120, and said ~~digesting~~ is carried out to provide a brownstock pulp having a kappa number in the range of 40 to 60.

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~~8~~ 32. A process of claim ~~30~~⁵ wherein said waste paperboard has a kappa number of 80 to 120 and said digesting is carried out to provide a brownstock pulp having a kappa number of 20 to 25.

~~7~~ ~~3~~ 33. A process of claim ~~31~~⁶ in which said paperboard is corrugated paperboard.

~~9~~ 34. A process of claim ~~32~~⁸ in which said paperboard is corrugated paperboard.

35. A process of claim 33 wherein said elevated temperature is in the range of 150°C to 180°C.

36. A process of claim 34 wherein said elevated temperature is in the range of 150°C to 180°C.

37. A process of claim 35 wherein said aqueous cooking liquor comprises a kraft white liquor. *Not 3*

38. A process of claim 36 wherein said aqueous cooking liquor comprises a kraft white liquor.

~~11~~ 39. A process of claim ~~38~~¹⁰ including a step of subjecting said brownstock pulp to a chemical bleaching operation to produce a bleached delignified pulp for bleached paper products.

~~13~~ 40. A process of claim ~~39~~¹ wherein said cooking liquor is employed in an amount relative to the waste paper product, of about 55 to 65%, of the cooking liquor for producing an equivalent amount of virgin pulp from wood chips.

~~41~~ 41. A cellulosic pulp derived by digesting waste manufactured paper product in an aqueous cooking liquor at an elevated temperature to effect delignification of said paperboard, said pulp having a kappa number lower than that of said paper product.

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42. A cellulosic pulp of claim 41 derived from waste corrugated paperboard.

43. A cellulosic pulp of claim 41 having a kappa number of 40 to 60 derived from waste corrugated paperboard having a kappa number of 80 to 120.

44. A cellulosic pulp of claim 41 having a kappa number of 20 to 25 derived from waste corrugated paperboard having a kappa number of 80 to 120.

45. A chemically bleached pulp of claim 44.

46. A pulp of claim 41 characterized in that said pulp comprises fibers of a quality such that the pulp can be employed as the sole pulp in paper product manufacture.

47. A pulp of claim 42 characterized in that said pulp comprises fibers of a quality such that the pulp can be employed as the sole pulp in paper product manufacture.

DRAWINGS:

Permission is requested to amend Figure 1 of the drawings as shown in red ink on the attached copy.

REMARKS

Claims 1 to 47 are in the case.

Typographical errors at pages 6 and 8 have been attended to.

It is proposed to amend Figure 1 to delete the erroneous inclusion of integer 62 identifying steam line 66.

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New claims 22 to 47 are presented to better protect the invention disclosed in this application. Claims 22 to 40 are drawn to the process and claims 41 to 47 are drawn to a cellulosic pulp derived from the digestion of waste manufactured paper product.

As explained in the specification of this application and demonstrated by prior art brought to the Examiner's attention, prior proposals for recycling used paper products, for example, paperboard, have typically involved reslushing the used paper product to form a slurry of fibers, and using these fibers in admixture with virgin fibers to produce a paper product.

The prior procedures used in the art have not involved cooking of the waste paper product to lower the kappa number.

In the case of the conventionally employed reslushed or repulped fibers, produced from waste paper products such as paperboard, which fibers have been employed, as indicated above, with virgin fibers, it has generally been found that the repulped or reslushed fibers are of inferior quality as compared with virgin pulp fibers such that they cannot be employed as the sole fibers in paper manufacture. It has been generally accepted that the inferior quality of such repulped or reslushed fibers as compared with comparable virgin pulp fibers, arises from the processing to which the fibers were subjected during the original paper product manufacture, and also from aging of the paper product.

It was thus unexpected and surprising that the cooking procedure of the present invention would produce cellulosic fibers having strength qualities such that

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they could be employed as the sole fibers in the manufacture of paper products. This surprising discovery was certainly not to have been expected from the state of the art.

The examples in the specification demonstrate the high viscosities obtained in the pulp product when employing the process of the invention. The viscosities are a measure of the strength of the fibers and generally, it is accepted that if a viscosity is 10 or more, satisfactory paper products can be produced from the fibers as the sole fiber component. Thus, for example, the corrugated waste starting material in Example 5 had a kappa number of 91.5 and a viscosity of 32.8. The pulp produced in accordance with the present invention, which was produced in a yield of 81.2%, had a significantly lower kappa number, namely 52.8, and still had a surprisingly high viscosity, namely 24.2. The other Examples also demonstrate acceptable viscosity values for the resulting pulp.

The process of the present invention is more especially carried out with delignification under non-oxidizing conditions, these being inherent in the use of an aqueous cooking liquor. The process may typically be carried out under an atmosphere of steam (see page 12).

By comparison, when the corrugated waste of Example 5, having a kappa number of 91.5 and a viscosity of 32.8, was subjected to an oxygen delignification process in accordance with comparison Example 13, the resulting pulp, although having a kappa of 49, had a significantly lower viscosity, namely 14.2.

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Comparison Example 15 demonstrates that a paper produced from a pulp developed from a waste paper product in accordance with the present invention, was superior to a paper produced from the same waste paper but by the conventional procedure involving reslushing to produce a pulp, in which there is no cooking or delignification of the waste.

Claims 22 to 47 now presented are more particularly drawn to the novel step of digesting waste manufactured paper product in an aqueous cooking liquor under elevated temperature conditions to effect delignification and produce a pulp having a kappa number lower than that of the paper product. The product claims now presented are directed to the product of such a process.

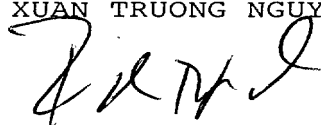
The process and product of the new claims are novel and the results achieved were unexpected and contrary to the widely held views in the art as to the suitability of such recycled products for making high quality value added paper products.

Favourable consideration of all the claims now presented is requested.

Respectfully,

XUAN TRUONG NGUYEN

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I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Central Post Office, Patents and Trademarks, Washington, D.C. 20531

on June 25, 1991

(Date of Deposit)

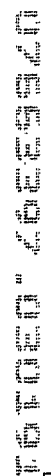
Antoinette Sullo

Name and Reg. No. of Attorney

Signature

6-25-91

Date of Signature





PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: **XUAN TRUONG NGUYEN** Docket No.: **91-169**
 Serial No.: **663,397** Group No.: **133**
 Filed: **March 1, 1991** Examiner:
 For: **RECYCLING WASTE CELLULOSTIC MATERIAL**

Commissioner of Patents and Trademarks
 Washington, D.C. 20231

AMENDMENT TRANSMITTAL

1. Transmitted herewith is an amendment for this application.

STATUS

2. Applicant is

- ☐ a small entity — verified statement:
 ☐ attached.
 ☐ already filed.
☒ other than a small entity.

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CERTIFICATE OF MAILING (37 CFR 1.8a)

I hereby certify that this paper (along with any referred to as being attached or enclosed) is being deposited with the United State Postal Service on the date shown below with sufficient postage as first class mail in an envelope addressed to the: Commissioner of Patents and Trademarks, Washington, D.C. 20231.

Antoinette Sullo

(Type or print name of person mailing paper)

Date: June 25, 1991

Antoinette Sullo
 (Signature of person mailing paper)

EXTENSION OF TERM

NOTE: "Extension of Time in Patent Cases (Supplement Amendments) — If a timely and complete response has been filed after a Non-Final Office Action, an extension of time is not required to permit filing and/or entry of an additional amendment after expiration of the shortened statutory period.

If a timely response has been filed after a Final Office Action, an extension of time is required to permit filing and/or entry of a Notice of Appeal or filing and/or entry of an additional amendment after expiration of the shortened statutory period unless the timely-filed response placed the application in condition for allowance. Of course, if a Notice of Appeal has been filed within the shortened statutory period, the period has ceased to run." Notice of December 10, 1985 (1061 O.G. 34-35).

NOTE: See 37 CFR 1.645 for extensions of time in interference proceedings and 37 CFR 1.550(c) for extensions of time in reexamination proceedings.

3. The proceedings herein are for a patent application and the provisions of 37 CFR 1.136 apply

(complete (a) or (b) as applicable)

(a) ☐ Applicant petitions for an extension of time for the total number of months checked below:

Extension (months)	Fee for other than small entity	Fee for small entity
<input type="checkbox"/> one month	\$100.00	\$ 50.00
<input type="checkbox"/> two months	\$300.00	\$150.00
<input type="checkbox"/> three months	\$730.00	\$365.00
<input type="checkbox"/> four months	\$1150.00	\$575.00
		Fee \$ _____

If an additional extension of time is required please consider this a petition therefor.

(check and complete the next item, if applicable)

☐ An extension for _____ months has already been secured and the fee paid therefor of \$_____ is deducted from the total fee due for the total months of extension now requested.

Extension fee due with this request \$ _____

OR

(b) ☒ Applicant believes that no extension of term is required. However, this conditional petition is being made to provide for the possibility that applicant has inadvertently overlooked the need for a petition for extension of time.

FEE FOR CLAIMS

4. The fee for claims has been calculated as shown below:

(Col. 1)		(Col. 2)		(Col. 3)		SMALL ENTITY	OTHER THAN A SMALL ENTITY	
CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NO PREVIOUSLY PAID FOR		PRESENT EXTRA		RATE	ADDIT. FEE	OR RATE ADDIT. FEE
TOTAL	47	MINUS	21	=	26	x10 = \$		x20 = \$ 520
INDEP.	4	MINUS	3	=	1	x30 = \$		x60 = \$ 60
<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEP. CLAIM						+100 = \$		+200 = \$ --
						TOTAL \$	OR TOTAL \$	580
						ADDIT. FEE \$		

- * If the entry in Col. 1 is less than entry in Col. 2, write "0" in Col. 3.
 ** If the "Highest No. Previously Paid for" IN THIS SPACE is less than 20, enter "20".
 *** If the "Highest No. Previously Paid For" IN THIS SPACE is less than 3, enter "3".
 The "Highest No. Previously Paid For" (Total or indep.) is the highest number found in the appropriate box in Col. 1 of a prior amendment or the number of claims originally filed.

(complete (c) or (d) as applicable)

- (c)
- ☐
- No additional fee for claims is required

OR

- (d)
- ☒
- Total additional fee for claims required \$ 580

FEE PAYMENT

5. ☒ Attached is a check in the sum of \$ 580.00
☐ Charge Account No. _____ the sum of \$ _____

A duplicate of this transmittal is attached.

FEE DEFICIENCY

NOTE: If there is a fee deficiency and there is no authorization to charge an account, additional fees are necessary to cover the additional time consumed in making up the original deficiency. If the maximum, six-month period has expired before the deficiency is noted and corrected, the application is held abandoned. In those instances where authorization to charge is included, processing delays are encountered in returning the papers to the PTO Finance Branch in order to apply these charges prior to action on the cases. Authorization to charge the deposit account for any fee deficiency should be checked. See the Notice of April 7, 1986, 1065 O.G. 31-33.

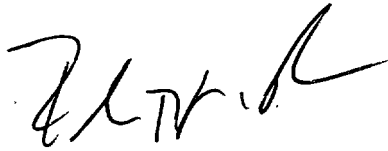
6. ☒ If any additional extension and/or fee is required charge Account No. 02-0184

AND/OR

☒ If any additional fee for claims is required, charge Account No. 02-0184

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02-0184-00000000